Pre-Decisional EA

ENVIRONMENTAL ASSESSMENT

Deer Damage Management in the Commonwealth of Virginia

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UNITED STATE DEPARTMENT OF AGRICULTURE
ANIMAL AND PLANT HEALTH INSPECTION SERVICE
WILDLIFE SERVICES

In Conjunction With:

VIRGINIA DEPARTMENT OF GAME AND INLAND FISHERIES (VDGIF)

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SUMMARY OF PROPOSED ACTION

The United States Department of Agriculture, Animal and Plant Health Inspection Service, Wildlife Services (WS) proposes to continue the current deer (*Odocoileus virginianus)* damage management program in the Commonwealth of Virginia. WS would provide technical assistance and would lethally remove deer to alleviate damage to agriculture, property, natural resources, and human health and safety. Deer damage management would be conducted primarily on agricultural property, in urban/suburban areas, and at airports and airbases in Virginia when the resource owner (property owner) or manager requests assistance. Deer damage in Virginia primarily includes damage to agricultural resources, damage to urban/suburban landscaping, damage to property and human safety from deer-vehicle and deer-aircraft collisions, and concerns about the spread of disease. WS recommends and utilizes an Integrated Wildlife Damage Management (IWDM) approach to manage wildlife conflicts. Under the proposed action, WS would assist with the implementation of one aspect of an IWDM plan, the lethal removal of deer by shooting or by live-capture and euthanasia to reduce damage to agricultural resources, property, natural resources, and human health and safety. Implementation of non-lethal methods recommended by WS as part of an IWDM approach would be the responsibility of the property owner or manager. Lethal deer removal would be conducted by WS in situations where non-lethal damage management methods such as physical exclusion or harassment are not appropriate, have been ineffective, or were inadequate to achieve deer damage management goals when used alone. WS would provide technical assistance to property owners or managers regarding the use of non-lethal and lethal methods of deer damage management. Technical assistance includes: instructional sessions, information about exclusion devices, harassment, and lethal damage management methods (e.g. regulated hunting or Kill Permits).

ACRONYMS

ADC	Animal Damage Control
AOA	Aircraft Operating Area
APHIS	Animal and Plant Health Inspection Service
AVMA	American Veterinary Medical Association
CCC	Cultural Carrying Capacity
CFR	Code of Federal Regulations
DCAP	Deer Control Assistance Program
DMAP	Deer Management Assistance Program
EA	Environmental Assessment
EIS	Environmental Impact Statement
EJ	Environmental Justice
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FY	Fiscal Year
IWDM	Integrated Wildlife Damage Management
MIS	Management Information System
MOU	Memorandum of Understanding
NEPA	National Environmental Policy Act
SOP	Standard Operating Procedure
T&E	Threatened and Endangered
USC	United States Code
USDA	U.S. Department of Agriculture
USDI	U.S. Department of Interior
USFWS	U.S. Fish and Wildlife Services
VAC	Virginia Annotated Code
VDACS	Virginia Department of Agriculture and Consumer Services
VDGIF	Virginia Department of Game and Inland Fisheries
WS	Wildlife Services

NOTE: On August 1, 1997, the Animal Damage Control program was officially renamed to Wildlife Services. The terms Animal Damage Control, ADC, Wildlife Services, and WS are used synonymously throughout this Environmental Assessment.

Chapter 1 PURPOSE AND NEED FOR ACTION

1.0 INTRODUCTION

Across the United States, wildlife habitat has been substantially changed as human populations expand and land is used for human needs. These human uses and needs often compete with wildlife which increases the potential for conflicting human/wildlife interactions. In addition, segments of the public desire protection for all wildlife; this protection can create localized conflicts between human and wildlife activities. The *Animal Damage Control Programmatic Final Environmental Impact Statement* (EIS) summarizes the relationship in American culture of wildlife values and wildlife damage in this way (United States Department of Agriculture (USDA) 1997):

> "*Wildlife has either positive or negative values, depending on varying human perspectives and circumstances . . . Wildlife is generally regarded as providing economic, recreational and aesthetic benefits . . . and the mere knowledge that wildlife exists is a positive benefit to many people. However . . . the activities of some wildlife may result in economic losses to agriculture and damage to property . . . Sensitivity to varying perspectives and value is required to manage the balance between human and wildlife needs. In addressing conflicts, wildlife managers must consider not only the needs of those directly affected by wildlife damage but a range of environmental, sociocultural and economic considerations as well.*"

Wildlife damage management is the science of reducing damage or other problems caused by wildlife and is recognized as an integral part of wildlife management (The Wildlife Society 1992). Wildlife Services (WS) (WS was formerly known as Animal Damage Control) uses an Integrated Wildlife Damage Management (IWDM) approach, known as Integrated Pest Management (Animal Damage Control (ADC) Directive 2.105[1]), in which a combination of methods may be used or recommended to reduce wildlife damage. IWDM is described in Chapter 1:1-7 of USDA (1997). These methods may include alteration of cultural practices and habitat and behavioral modification to prevent or reduce damage. The reduction of wildlife damage may also require that local populations be reduced through lethal means.

This environmental assessment (EA) documents the analysis of the potential environmental effects of a proposed Virginia WS white-tailed deer (*Odocoileus virginianus*) damage management program. This analysis relies mainly on existing data contained in published documents (Appendix A), including the *Animal Damage Control Program Final Environmental Impact Statement* (USDA 1997) to which this EA is tiered. USDA (1997) may be obtained by contacting the USDA, Animal and Plant Health Inspection Service (APHIS), WS Operational Support Staff at 4700 River Road, Unit 87, Riverdale, MD 20737-1234.

WS is the Federal agency directed by law and authorized to protect American resources from damage associated with wildlife (Animal Damage Control Act of March 2, 1931, as amended 46 Stat. 1486; 7 USC. 426-426c and the Rural Development, Agriculture, and Related Agencies Appropriations Act of 1988, Public law 100-102, Dec. 27, 1987. Stat. 1329-1331 (7 USC 426C). To fulfill this Congressional direction, WS activities are conducted to prevent or reduce wildlife damage to agricultural, industrial and natural resources, property, and threats to public health and safety on private and public lands in cooperation with federal, state and local agencies, private organizations, and individuals. Therefore, wildlife damage management is not based on punishing offending animals but as one means of reducing damage and is used as part of the WS Decision Model (Slate et al. 1992). The imminent threat of damage or loss of resources is often sufficient for individual actions to be initiated. The need for action is derived from the specific threats to resources or the public.

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[1] WS Policy Manual - Provides guidance for WS personnel to conduct wildlife damage management activities through Program Directives. WS Directives referenced in this EA can be found in the manual but will not be referenced in the Literature Cited Appendix.

Normally, according to the APHIS procedures implementing the National Environmental Policy Act (NEPA), individual wildlife damage management actions could be categorically excluded (7 CFR 372.5(c), 60 Fed. Reg. 6,000 - 6,003, (1995)). WS has decided in this case to prepare this EA to facilitate planning, interagency coordination, and the streamlining of program management, and to clearly communicate with the public the analysis of individual and cumulative impacts. In addition, this EA has been prepared to evaluate and determine if there are any potentially significant or cumulative impacts from the proposed and planned damage management program. All wildlife damage management that would take place in Virginia would be undertaken according to relevant laws, regulations, policies, orders and procedures, including the Endangered Species Act (ESA). Notice of the availability of this document will be published in newspapers, consistent with the agency's NEPA procedures.

WS is a cooperatively funded, service-oriented program that receives requests for assistance from other governmental agencies and entities. Before any wildlife damage management is conducted, Cooperative Agreements, Agreements for Control or other comparable documents are in place. As requested, WS cooperates with land and wildlife management agencies to reduce wildlife damage effectively and efficiently according to applicable federal, state and local laws and Memorandums of Understanding (MOUs) between WS and other agencies. WSs' mission, developed through its strategic planning process, is: 1) *"to provide leadership in wildlife damage management in the protection of America's agricultural, industrial and natural resources, and 2) to safeguard public health and safety."* WS's Policy Manual reflects this mission and provides guidance for engaging in wildlife damage management through:

- Training of wildlife damage management professionals;
- Development and improvement of strategies to reduce losses and threats to humans from wildlife;
- Collection, evaluation, and dissemination of management information;
- Informing and educating the public on how to reduce wildlife damage;
- Providing data and a source for limited-use management materials and equipment, including pesticides (USDA 1999).

1.1 AUTHORITY AND COMPLIANCE

1.1.1. Wildlife Services Legislative Authority

One statutory authority for the WS program is the Animal Damage Control Act of 1931, which provides that:

"The Secretary of Agriculture is authorized and directed to conduct such investigations, experiments, and tests as he may deem necessary in order to determine, demonstrate, and promulgate the best methods of eradication, suppression, or bringing under control on national forests and other areas of the public domain as well as on State, Territory or privately owned lands of mountain lions, wolves, coyotes, bobcats, prairie dogs, gophers, ground squirrels, jackrabbits, brown tree snakes and other animals injurious to agriculture, horticulture, forestry, animal husbandry, wild game animals , furbearing animals, and birds, and for the protection of stock and other domestic animals through the suppression of rabies and tularemia in predatory or other wild animals; and to conduct campaigns for the destruction or control of such animals. Provided that in carrying out the provisions of this Section, the Secretary of Agriculture may cooperate with States, individuals, and public and private agencies, organizations, and institutions."

Since 1931, with the changes in societal values, WS policies and its programs place greater emphasis on the part of the Act discussing "bringing (damage) under control", rather than "eradication" and "suppression" of wildlife populations. In 1988, Congress strengthened the legislative directive and authority of WS with the Rural Development, Agriculture, and Related Agencies Appropriations Act. This Act states, in part:

"That hereafter, the Secretary of Agriculture is authorized, except for urban rodent control, to conduct activities and to enter into agreements with States, local jurisdictions, individuals, and public and private agencies, organizations, and institutions in the control of nuisance mammals and birds and those mammals and birds species that are reservoirs for zoonotic diseases, and to deposit any money collected under any such agreement into the appropriation accounts that incur the costs to be available immediately and to remain available until expended for Animal Damage Control activities."

1.1.2 Virginia Department of Game and Inland Fisheries Legislative Authority

The Virginia Department of Game and Inland Fisheries (VDGIF), under the direction of the Governor-appointed Board of Directors, is specifically charged by the General Assembly with the management of the state's wildlife resources. Although many legal mandates of the Board and the Department are expressed throughout the Virginia Annotated Code (VAC), the primary statutory authorities include wildlife management responsibilities (VAC §§ 29.1-103), public education charges (VAC §§29.1-109), law enforcement authorities (VAC §§ 29.1-109), and regulatory powers (VAC §§ 29.1-501). In 1990, the Board of Directors adopted mission statements to help clarify and interpret the role of VDGIF in managing the wildlife resources of Virginia. They are:

- To manage Virginia's wildlife and inland fisheries to maintain optimum populations of all species to serve the needs of the Commonwealth;
- To provide opportunity for all to enjoy wildlife, inland fisheries, boating and related outdoor recreation; and
- To promote safety for persons and property in connection with boating, hunting, and fishing.

VDGIF currently has a MOU with WS. This document establishes a working relationship between WS and VDGIF, outlines responsibilities, and sets forth annual objectives and goals of each agency for resolving wildlife damage management conflicts in Virginia.

1.1.3 Compliance with Federal and State Statutes

Several federal laws, state laws, and state regulations regulate WS wildlife damage management. WS complies with these laws and regulations, and consults and cooperates with other agencies as appropriate.

National Environmental Policy Act. Environmental documents pursuant to NEPA must be completed before operational activities consistent with the NEPA decision can be implemented. WS also coordinates specific projects and programs with other agencies. The purpose of these contacts is to coordinate any wildlife damage management that may affect resources managed by these agencies or affect other areas of mutual concern.

Endangered Species Act. It is federal policy, under the ESA, that all federal agencies shall seek to conserve endangered and threatened species and shall utilize their authorities in furtherance of the purposes of the Act (Sec. 2(c)). WS conducts Section 7 consultations with the United States Fish and Wildlife Service (USFWS) to use the expertise of the USFWS to ensure that "any action authorized, funded or carried out by such an agency. . . is not likely to jeopardize the continued existence of any endangered or threatened species. . . each agency shall use the best scientific and commercial data available" (Sec. 7(a)(2)).

Kill Permits As provided by Virginia State Statue Division I, General Statutory provisions, ***Title 29.1,***

***Game, Inland Fisheries and Boating, Chapter 5, Wildlife and Fish Laws, Article 2, Hunting and Trapping, (§29.1-529). Killing of deer or bear damaging fruit trees, crops, livestock or personal property or creating a hazard to aircraft* or motor vehicles,** the VDGIF is mandated to permit owners or lessees of land on whose lands deer are causing damage to kill such deer. Under the kill permit system, a landowner/lessee sustaining damage must report the damage to the local game warden for investigation. If upon the investigation the game warden (or designee of the Director) determines that deer are responsible for the reported damage, he/she is required to authorize in writing that the owner/lessee, or other person(s) designated by the game warden, be allowed to kill deer when they are found upon the property where the damage occurred. If deer are causing damage on properties of five acres or less, the VDGIF has discretion as to whether to issue authorization to kill the deer, unless the property is used for commercial agricultural production.

Animal Population Control Permits (DPOP)(4 VAC 15-40-240). Whenever biological evidence suggests that populations of deer may exceed or threaten to exceed the carrying capacity, or whenever population reduction is necessary to manage for another wildlife species, or whenever the health or general condition of the deer population indicates the need for population reduction, or whenever the threat of human health and safety or significant economic loss indicates the need for population reduction, VDGIF is authorized to issue special permits to obtain the desired reduction by licensed hunters on prescribed areas.

Possession, Transportation, and Release of Wildlife by Authorized Persons. This regulation (4 VAC §§15-30-50) authorizes employees of federal wildlife management agencies and local animal control officers in the performance of their duties to take problem wildlife in the Commonwealth of Virginia.

1.2 RELATIONSHIP TO OTHER ENVIRONMENTAL DOCUMENTS

1.2.1 ADC Programmatic Environmental Impact Statement. WS has issued a Final EIS on the national APHIS/WS program (USDA 1997). Pertinent and current information available in the EIS has been incorporated by reference into this EA.

1.3 BACKGROUND AND NEED FOR DEER DAMAGE MANAGEMENT IN VIRGINIA

1.3.1 Virginia Deer Population History and Status

The deer population in Virginia, like that of most southeastern states, has undergone significant changes in the past 400 years. At the time of European settlement around 1600, deer were plentiful, with an estimated pre-colonial population of approximately 400,000 (Knox 1997). Subsequent declines in Virginia's deer population resulted from extensive overharvest, habitat loss due to deforestation and agriculture, and lack of law enforcement (Knox 1997). As in most southeastern states, the deer population reached a low in the early 1900's, with the deer populations in most of Virginia's Mountain and Piedmont regions extirpated (VDGIF 1999, Knox 1997). Robertson (1931) estimated that the total deer population in Virginia was only about 25,000 in 1931 (Knox 1997).

The Virginia deer population has increased significantly in the past 65-70 years. This increase is primarily attributed to reforestation, farm abandonment, protective games laws, effective law enforcement, and restocking (VDGIF 1999). Currently, the total Virginia deer population is stable and is conservatively estimated at approximately 900,000 animals (Knox 1997).

With this change in the population status of deer in Virginia has come a change in management objectives.

Current objectives are "to provide as much recreational hunting opportunity as possible without harming the resource and to apply population control where necessary to maintain herd health and to reduce crop depredation (VDGIF 1999)." In most of Virginia, deer management objectives have switched from establishing and increasing deer herds to controlling deer population growth (VDGIF 1999). This change in management strategy is based on the cultural carrying capacity (CCC). CCC was described by Ellingwood and Spignesi (1986) as "the maximum number of deer that can compatibly co-exist with a local human population" (Minnis and Peyton 1995, VDGIF 1999). CCC varies greatly within and between communities (VDGIF 1999). Others have labeled the notion of CCC as "social carrying capacity" (Stoll and Mountz 1983, Decker et al. 1985, Purdy 1987) and later as "wildlife acceptance capacity" (Decker and Purdy 1988, Decker 1991).

1.3.2 Deer Damage to Agriculture

Deer damage a wide variety of agricultural resources, including row crops, forage crops, vegetables, fruit trees, nursery stock, ornamentals, and stored hay (Craven and Hygnstrom 1994). In addition to the immediate losses, there may be residual damage in the form of future yield reduction for fruit trees or forage crops, and ornamental trees or nursery stock may be permanently disfigured by deer browsing (Craven and Hygnstrom 1994). Although browsing is the most common type of damage, deer may also damage agricultural crops by trampling or antler rubbing (Dolbeer et al. 1994). In orchards, antler rubbing may severely damage trees by removing bark and cambium and breaking small branches (Matschke et al. 1984).

In 1992, USDA's National Agricultural Statistics Service conducted a survey and identified deer damage as the most widespread form of wildlife damage, with 40% of farmers that responded reporting to have suffered agricultural damage from deer (Craven and Hygnstrom 1994). There are no nationwide estimates of annual crop losses from deer damage (Craven and Hyngstrom 1994).

In 1993, the VDGIF established a Deer Damage Committee to evaluate deer damage to agricultural crops in Virginia (VDGIF 1994, VDGIF 1999). This Committee estimated that in 1992 deer caused approximately $11.4 million in damage to agricultural crops. Most of this damage was to soybeans, peanuts, and orchards with $6.3, $2.0, and $1.9 million in damage, respectively (VDGIF 1994, VDGIF 1999).

A study conducted by Virginia Polytechnic Institute and State University in 1996 surveyed 1,506 agricultural producers and homeowners to collect information about deer damage in Virginia. Fifty-eight percent of respondents reported experiencing deer damage during 1995 (West 1998). Agricultural producers were more likely to experience deer damage (71%) than homeowners (36%). Seventy percent of respondents expressed a desire for a reduction in Virginia's deer population (West 1998, VDGIF 1999).

The issuance of deer kill permits can also be used as an index of deer damage to crops in Virginia. Kill permits, as provided by Virginia State Statute §29.1-529, mandates VDGIF to permit owners or lessees of land where deer are causing damage to kill such deer. The number of deer kill permits issued in Virginia has been increasing over the past decade, from 515 permits in 1989 to 1,668 in 1999 (VDGIF 1999, VDGIF per. comm. 2000).

The Deer Management Assistance Program (DMAP) and Deer Control Assistance Program (DCAP) were implemented by VDGIF in 1988. DMAP is a site-specific program that allows landowners a more liberal harvest of antlerless deer than allowed under current regulations. The objectives of DMAP were to allow landowners and hunt clubs to manage their deer herds on a local level, while also increasing the VDGIF's

biological database and improving communication between VDGIF and hunters and landowners (VDGIF 1999). DCAP is a site-specific deer damage management program that allows landowners a more liberal harvest of antlerless deer than allowed under current harvest regulations. The objectives of the DCAP program were to assist landowners in the control of deer damage to crops and other property while maximizing hunter participation and shifting the closed-season Kill Permit deer harvest(s) into the open deer season (VDGIF 1999).

1.3.3 Deer-Vehicle Collisions

Deer-vehicle collisions are a serious concern nationwide because of losses to property and the potential for human injury or even death (Conover 1997, Conover et al. 1995, Romin and Bissonette 1996). Conover et al. (1995) estimated that 1.5 million deer-vehicle collisions occur each year in the United States and that the average cost to repair the vehicle after a collision with a deer was $1,500. Conover et al. (1995) thus estimated that the total damage to vehicles in the United States each year from deer-vehicle collisions is greater than $1 billion. Additionally, Conover et al. (1995) estimated that deer-vehicle collisions in the United States result in 29,000 injuries and 211 human fatalities annually. Nationwide Insurance (1993) estimated that 120 people are killed annually in animal-vehicle accidents in the United States.

Although reliable deer-vehicle collision data is not available for Virginia, the VDGIF conservatively reported that there may be tens of thousands of deer-vehicle collisions in the state each year (VDGIF 1999). From 1985-1994, there were 12 reported fatalities in Virginia that were the result of deer-vehicle collisions (VDGIF 1999). The Deer Damage Committee established by the VDGIF estimated that approximately $4.2 million in damage to property resulted from deer-vehicle collisions in Virginia each year from 1987-1991 (West 1998).

A study of reported deer-related vehicle accidents in Lynchburg, Virginia from 1987-1991 found that a majority of the accidents (54%) occurred in the months of October, November, and December, with 25.9% occurring in November (Scanlon et al. 1995). Additionally, while accidents occurred at all hours, most (50%) of the accidents occurred between 1700 and 0100 hrs. and about 12% occurred between 0600 and 0900 hrs (Scanlon et al. 1995). Data from reported deer-vehicle accidents in Fairfax County, Virginia also showed that October, November, and December were the peak months for deer-vehicle accidents, with November (26.8%) as the highest month (County of Fairfax 1998).

1.3.4 Damage to Landscaping and Natural Resources

In addition to damage to agricultural property and to vehicles, deer can also damage property such as landscaping and ornamental plantings. As development expands into previously rural areas, deer habitat may actually be enhanced because fertilized lawns, gardens, and landscape plants serve as high quality sources of food (Swihart et al. 1995). Furthermore, deer are prolific and adaptable, characteristics which allow them to exploit and prosper in most suitable habitat near urban areas, including residential areas (Jones and Witham 1995). Although damage to landscaping and ornamental plants has not been quantified, deer can cause severe and very costly property damage for homeowners and in parks and common areas.

Deer overabundance can affect native vegetation and natural ecosystems in addition to private property and ornamental plantings. Numerous studies have shown that overbrowsing by deer can decrease tree reproduction, understory vegetation cover, plant density, and plant diversity (Warren 1991). For example, in the Great Smokey Mountains National Park in Tennessee, an area heavily populated by deer had a reduction in the number of plant species, a loss of hardwood species and a predominance of conifer species

compared to an ecologically similar control area with fewer deer (Bratton 1979). This alteration and degradation of habitat from overbrowsing by deer can have a detrimental effect on deer herd health and may displace other wildlife communities (e.g., neotropical migrant songbirds and small mammals) that depend upon the understory vegetative habitat destroyed by deer browsing (VDGIF 1999). For example, deer browsing may affect vegetation that songbirds need for foraging surfaces, escape cover, and nesting (DeCalesta 1997). DeCalesta (1994) found that the species richness and abundance of intermediate canopy nesting songbirds was reduced in areas with higher deer densities. Casey and Hein (1983) found that 3 species of birds were lost in a research preserve stocked with high densities of ungulates and that the densities of several other species of birds were lower than in an adjacent area with lower deer density.

1.3.5 Threats to Human Health and Safety from Disease Transmission

Currently, the most common zoonosis involving deer is Lyme disease, caused by the spirochete *Borrelia burgdorferi* and vectored to humans by the deer tick (*Ixodes dammini* in the eastern U.S.) (Conover 1997). Initial symptoms of Lyme disease include a flu-like illness with headache, fever, muscle or joint pain, neck stiffness, swollen glands, jaw discomfort, and inflammation of the eye membranes (McLean 1994). If left untreated, heart, nervous system, and joint manifestations may develop (McLean 1994).

Research has shown a correlation between infected ticks, deer numbers, and Lyme disease cases (Deblinger et al. 1993, Magnarelli et al. 1984). Deer are an important reservoir for Lyme disease and are the primary host for the adult deer tick (Conover 1997). In Virginia, 262 cases of Lyme disease were recorded from 1997 to 1999 according to statistics provided by the Office of Epidemiology at the Virginia Department of Health. The number of reported cases of Lyme disease may reflect low incident of transmission (Davidson and Nettles 1997) or difficulties diagnosing the disease.

In 1986, another serious tick-borne zoonosis, human ehrlichiosis, was discovered in the United States (McQuiston et al. 1999). Two distinct forms of the illness may affect humans: human monocytic ehrlichiosis (HME) and human granulocytic ehrlichiosis (HGE) (McQuiston et al. 1999, Lockhart et al. 1997). The bacterial agents that cause ehrlichiosis are transmitted to humans by infected ticks which acquire the agents from feeding on infected animal reservoirs (McQuiston et al. 1999). Ehrlichiosis in humans may result in fever, headache, myalgia, nausea, and occasionally death (McQuiston et al. 1999, Little et al. 1998). HME is the type of ehrlichiosis predominantly found in the southeastern, south-central, and mid-Atlantic U.S. White-tailed deer are major hosts for *Amblyomma americanum*, the tick which transmits HME, and deer have been identified as a reservoir for HME (Little et al. 1998, Lockhart et al. 1997).

1.3.4 Deer Damage at Airports and Airbases

Wildlife collisions with aircraft are a serious economic and safety problem (Dolbeer et al. 2000). Cleary et al. (1999) estimated that between 1990 and 1998 wildlife strikes cost the U.S. civil aviation industry a minimum of 92,233 hours/year of aircraft down time, $50.60 million/year in direct monetary losses, and $26.59 million/year in associated costs. In a recent study which ranked the hazard to aviation for wildlife species commonly involved in aircraft strikes, deer were ranked as the most hazardous species group (Dolbeer et al. 2000). This study found that 87% of reported deer-aircraft collisions resulted in damage. This was the highest percent of reported damage occurrence of any species studied. Also, 53% of deer-aircraft strike reports noted an effect on the flight (aborted take-off, engine shutdown, precautionary landing, etc.) (Dolbeer et al. 2000).

Deer are a significant safety concern to aircraft because of their abundance, behavior, and large body size. Deer are more than five times more likely than birds to cause damage when involved in an aircraft strike

(Wright et al. 1998). These animals feed, rest, and mate near runway areas and may wander onto runway surfaces or be startled or harassed into the path of incoming or departing aircraft. At night, deer may freeze when caught in the beams of light (i.e., approaching aircraft with landing lights on).

A total of 343 ungulate strikes have been reported from 1983-1997 to the Federal Aviation Administration (FAA), 48 from 1983-1990 when strikes were inconsistently reported, and 295 from 1991-1997 when records were more complete. From 1991-1997, there was an average of about 42 strikes per year. Species reported struck included 222 unidentified deer, 113 white-tailed deer, 5 elk, 2 moose, and 1 mule deer. Of the 121 ungulates identified to species, 93% were white-tailed deer. Of the 44 states reporting deer strikes, 26 states east of the Mississippi River reported 77% of the strikes (Wright et al. 1998).

Most deer strike reports were from corporate aircraft (41%) followed by private aircraft owners (33%) and commercial airlines (26%). Aircraft with the capacity for 1-10 passengers were involved in the majority (65%) of reported strikes. Aircraft, which carry 101-380 passengers, were involved in 14% of the strikes (Wright et al. 1998).

Deer strikes had an effect on 79% of the flights where effect was recorded (Wright et al. 1998). Effects included: aborted take-off (20%), precautionary landing (10%), engine shut down (2%), and other negative effects (47%). Aircraft were damaged in 87% of the reported deer strikes. Reports rarely showed the cost of deer-related damage: only 14% of the reports indicating damage provided estimated repair costs. Based on data from strike reports, which provided damage costs, the mean cost per deer strike was $74,537, translating to $21.2 million for the 285 reported damage strikes (Wright et al. 1998). The cost to repair a single part on a damaged aircraft can run into the millions of dollars. In addition to financial damage costs, deer-aircraft strikes pose a serious and immeasurable threat to human safety.

Because of the extremely high cost to repair aircrafts and the risks to human safety, airports should adopt a "zero tolerance" policy for deer within the Aircraft Operating Areas (AOA) (Wright et al. 1998). The FAA regulations (139.337) authorize airports to develop and implement wildlife hazard management plans as needed. The most secure protection against deer hazards to aviation is total exclusion with fencing in combination with population control (Wright et al. 1998). Habitat management and harassment techniques are also used to reduce deer threats to aviation.

There have been numerous deer-aircraft strikes at airports in Virginia, and some strikes have been costly. Deer-aircraft strikes have occurred at more than 10 civil airports and 2 military air bases in Virginia since 1990.

1.4 NEED FOR DEER DAMAGE MANAGEMENT IN VIRGINIA

The need for action in Virginia is based on the necessity for a program to protect agricultural and natural resources, property, and human health and safety from deer damage. The Virginia WS Program received 3,351 requests for wildlife damage management assistance from the public between federal FY95 and 99. During this period, deer damage management requests ranked as the 9th most common type of request for wildlife damage management assistance, with 74 requests received from the public. These data represent only a portion of the total damage caused by deer in Virginia because not all people who experience damage request assistance from WS.

1.5 SCOPE AND PURPOSE OF THIS EA

The scope and purpose of this EA is to address and evaluate the potential impact to the human environment from WS

deer damage management to protect agricultural and natural resources, property, and human health and safety in Virginia. Damage problems can occur throughout the State, resulting in requests for WS assistance. Under the Proposed Action, deer damage management could be conducted on private, federal, state, tribal, county, and municipal lands in Virginia upon request. Virginia encompasses about 26,090,880 acres; during Fiscal Year (FY) 98, WS had 6 *Agreements for Control* to conduct deer damage management on a total of 19,709 acres or less than 0.08% of the land area of Virginia (Management Information System (MIS) 1998). In FY 99, Virginia WS conducted damage management projects for deer damage management (respectively) on properties covering an area of about 16,800 acres or about 0.064% of the land area of Virginia (MIS 1999).

1.6 PROPOSED ACTION

The proposed action is to continue to implement the current Virginia WS deer damage management program for the protection of agricultural and natural resources, property, and human health and safety on agricultural properties, in urban/suburban areas, and on airports and airbases in Virginia where a need exists and a request is received. Under this alternative, WS would lethally remove deer primarily by shooting or, rarely, by live-capture and euthanasia to reduce damage to agricultural resources, property, and human health and safety. WS recommends and utilizes an Integrated Wildlife Damage Management (IWDM) approach to manage wildlife conflicts. Under the proposed action, WS would assist with the implementation of one aspect of an IWDM plan, the lethal removal of deer. Implementation of non-lethal methods recommended by WS as part of an IWDM approach would be the responsibility of the property owner or manager. Managers and property owners would continue to be provided technical assistance regarding the use of non-lethal and lethal methods of deer damage management. Technical assistance includes: instructional sessions, information about exclusion devices, harassment, and lethal damage management methods (e.g. hunting or Kill Permits). WS would conduct no direct operational deer management activities other than lethal deer removal. Deer damage management would be allowed in the State, when requested, on private or public property after an *Agreement for Control* or other comparable document has been completed. On agricultural properties, the property owner would be required to obtain a Kill Permit from the VDGIF. In urban/suburban areas, a Kill Permit or an Animal Population Control Permit (DPOP) would have to be obtained from VDGIF. All deer damage management would comply with appropriate federal, state and local laws and occur in cooperation with other governmental agencies and tribal governments. (See Chapter 3 for a more detailed description of the current program and the proposed action).

1.7 DECISION TO BE MADE

Based on the scope of this EA, the decisions to be made are:

- Should WS continue the current deer damage management program and lethally remove deer from agricultural properties, urban/suburban areas, and airports and airbases in Virginia, and provide technical assistance to property owners?
- Would the proposed action have significant impacts on the quality of the human environment, requiring preparation of an EIS?

1.8 SCOPE OF THIS ENVIRONMENTAL ASSESSMENT ANALYSIS

1.8.1 Actions Analyzed. This EA evaluates deer damage management by WS to protect: 1) property, 2) agricultural resources, 3) natural resources, and 4) human health and safety in Virginia. Protection of other resources or other program activities would be addressed in other NEPA analysis, as appropriate.

1.8.2 Wildlife Species Potentially Protected by Virginia WS. Virginia WS assistance may be requested to achieve management objectives for wildlife, including Threatened and Endangered (T&E) species. If other needs are identified, a determination would be made on a case-by-case basis if additional NEPA analysis is needed.

1.8.3 American Indian Lands and Tribes. Currently, Virginia WS does not have any MOUs with any American Indian tribe. If WS enters into an agreement with a tribe for deer damage management, this EA would be reviewed and supplemented if appropriate to insure compliance with NEPA. MOUs, agreements and NEPA compliance would be conducted as appropriate before deer damage management on tribal lands.

1.8.4 Period for which this EA is Valid. This EA would remain valid until Virginia WS and other appropriate agencies determine that new needs for action, changed conditions or new alternatives having different environmental effects must be analyzed. At that time, this analysis and document would be supplemented pursuant to NEPA. Review of the EA would be conducted each year to ensure that the EA is sufficient.

1.8.5 Site Specificity. This EA analyzes the potential impacts of deer damage management and addresses activities on all lands in Virginia under MOU, Cooperative Agreement and in cooperation with the appropriate public land management agencies. It also addresses the impacts of deer damage management on areas where additional agreements may be signed in the future. Wildlife damage management falls within the category of federal or other agency actions in which the exact timing or location of individual activities cannot usually be predicted well enough ahead of time to accurately describe such locations or times in an EA or EIS. The WS program is analogous to other agencies or entities with damage management missions such as fire and police departments, emergency clean-up organizations, insurance companies, etc. Although WS can predict some of the possible locations or *types* of situations and sites where some kinds of wildlife damage will occur, the program cannot predict the specific locations or times at which affected resource owners will determine a deer damage problem has become intolerable to the point that they request assistance from WS. Nor would WS be able to prevent such damage in all areas where it might occur without resorting to destruction of wild animal populations over broad areas at a much more intensive level than would be desired by most people, including WS and state agencies. Such broadscale population control would also be impractical, if not impossible, to achieve.

If a determination is made through this EA that the proposed action would have a significant environmental impact, then as EIS would be prepared. In terms of considering cumulative impacts, one EA analyzing impacts for the entire State may provide a better analysis than multiple EA's covering smaller zones.

1.9 PREVIEW OF THE REMAINDER OF THIS EA

The remainder of this EA is composed of four (4) chapters and one (1) appendix. Chapter 2 discusses and analyzes the issues and affected environment. Chapter 3 contains a description of each alternative, alternatives not considered in detail, mitigation and standard operating procedures (SOP). Chapter 4 analyzes environmental consequences and the environmental impacts associated with each alternative considered in detail. Chapter 5 contains the list of preparers of this EA. Appendix A contains the literature cited used during the preparation of the EA.

CHAPTER 2: ISSUES AND AFFECTED ENVIRONMENT

2.0 INTRODUCTION

Chapter 2 contains a discussion of the issues, including issues that received detailed environmental impact analysis in Chapter 4 (Environmental Consequences), issues used to develop mitigation measures and SOPs, and issues not considered in detail, with the rationale. Pertinent portions of the affected environment are included in this chapter in the discussion of issues used to develop mitigation measures. Additional affected environments are incorporated into the discussion of the environmental impacts in Chapter 4 and the description of the current program in Chapter 3.

2.1 AFFECTED ENVIRONMENT

The areas of the proposed action include farms and areas where deer are causing damage to agriculture through feeding and antler rubbing, and public and private properties in urban/suburban areas where deer cause damage to landscaping and natural resources, damage to property during deer-vehicle collisions, and are a threat to human safety through deer-vehicle collisions and the spread of disease. The area of the proposed action would also include airports and military airbases where deer are a threat to human safety and to property.

2.2 ISSUES ANALYZED IN DETAIL IN CHAPTER 4

Issues have been identified from comments received from the public and state and federal government agencies. The issues are summarized below:

- Effects on deer populations
- Effects on non-target species, including T&E species
- Effects on human health and safety
- Humaneness of methods to be used
- Impacts to stakeholders, including aesthetics
- Effects on urban landscaping and natural resources

2.2.1 Effects on deer populations

Some people are concerned whether the proposed action would result in the loss of the local deer population or could have a cumulative adverse impact on regional or statewide deer populations. WS has removed deer to reduce damage at airports under CE (7 CFR 372.5(c), 60 Fed Reg. 6,000-6,003, 1995). The most deer taken by WS was in FY1999 when 88 deer were removed, which had a minimal impact on the statewide or regional populations. The VDGIF has concurred that WS deer damage management activities would not adversely impact deer populations in the Commonwealth of Virginia, and that the deer population impacts covered by the EA would all be at a local level. In fact, from the VDGIF's viewpoint, "reduction of deer population levels and subsequent control of urban deer damage in areas where the landowner has specifically requested assistance would be beneficial" (W.M. Knox, VDGIF, letter to Martin Lowney, WS, September 14, 2000).

2.2.2 Effects on non-target species, including T&E species.

A common concern among members of the public and wildlife professionals, including WS personnel, is whether the proposed action or any of the alternatives might result in adverse impacts to populations of other wildlife, particularly T&E species. WS's mitigation measures and SOPs are designed to reduce the effects on non-target species' populations and are presented in Chapter 3. Terwilliger (1991), Terwilliger

and Tate (1995), and the USFWS list of T&E species in Virginia (http://www.fws.gov/r9endspp/endspp.html) were reviewed to identify federal and state T&E species in Virginia.

The USFWS Biological Opinion (U.S. Department of Interior (USDI) 1992) identified no T&E species in Virginia that would be adversely affected by deer damage control methods. Formal risk assessment (USDA 1997, Appendix P) has also shown that there are no probable risks to T&E species in Virginia from deer damage control methods.

2.2.3 Effects on human health and safety.

Some people are concerned that the methods used to remove deer might pose a hazard to people in the area. Another concern is that high deer populations pose a threat to human health and safety through the potential for deer-vehicle collisions, deer-aircraft collisions, and the spread of disease.

Firearm use is very sensitive and a public concern because of safety relating to the public, and misuse. To ensure safe use and awareness, WS employees who use firearms to conduct official duties are required to attend an approved firearms safety and use training program within 3 months of their appointment and a refresher course every 3 years afterwards (WS Directive 2.615). WS employees who carry firearms as a condition of employment, are required to sign a form certifying that they meet the criteria as stated in the *Lautenberg Amendment* which prohibits firearm possession by anyone who has been convicted of a misdemeanor crime of domestic violence.

2.2.4 Humaneness of methods to be used

Some people are concerned that WS methods used to remove deer are inhumane. The issue of humaneness, as it relates to the killing or capturing of wildlife is an important but complex concept. Kellert and Berry (1980) in a survey of American attitudes toward animals related that 58% of their respondents, "*. . . care more about the suffering of individual animals . . . than they do about species population levels.*" Schmidt (1989) indicated that vertebrate pest control for societal benefits could be compatible with animal welfare concerns, if "*. . . the reduction of pain, suffering, and unnecessary death is incorporated in the decision making process.*"

Suffering has been described as a "*. . . highly unpleasant emotional response usually associated with pain and distress.*" However, suffering "*. . . can occur without pain . . .*," and "*. . . pain can occur without suffering . . .* " (American Veterinary Medical Association (AVMA) 1986). Because suffering carries with it the implication of a time frame, a case could be made for "*. . . little or no suffering where death comes immediately . . .* " (California Department of Fish and Game (CDFG) 1991), such as the WS technique of shooting.

Defining pain as a component of humaneness may be a greater challenge than that of suffering. Pain obviously occurs in animals. Altered physiology and behavior can be indicators of pain, and identifying the causes that elicit pain responses in humans would "*. . . probably be causes for pain in other animals . . .* " (AVMA 1986). However, pain experienced by individual animals probably ranges from little or no pain to significant pain (CDFG 1991).

Pain and suffering as it relates to a review of WS damage management methods to capture animals, has both a professional and lay point of arbitration. Wildlife managers and the public would both be better served to recognize the complexity of defining suffering, since "*. . . neither medical or veterinary curricula explicitly*

address suffering or its relief" (CDFG 1991).

Research suggests that with some methods, such as restraint in leg-hold traps, changes in the blood chemistry of trapped animals indicate "*stress*" (USDA 1997: 3-81). However, such research has not yet progressed to the development of objective, quantitative measurements of pain or stress for use in evaluating humaneness.

Thus, the decision-making process involves tradeoffs between the above aspects of pain and humaneness. An objective analysis of this issue must consider not only the welfare of wild animals but also the welfare of humans if damage management methods were not used. Therefore, humaneness appears to be a person's perception of harm or pain inflicted on an animal, and people may perceive the humaneness of an action differently. The challenge in coping with this issue is how to achieve the least amount of suffering with the constraints imposed by current technology and funding.

Virginia WS personnel are experienced and professional in their use of management methods so that they are as humane as possible under the constraints of current technology and funding. Mitigation /SOPs used to maximize humaneness are listed in Chapter 3. As appropriate, WS euthanizes live animals by methods recommended by the AVMA (AVMA 1993) or the recommendations of a veterinarian, even though the AVMA euthanasia methods are guidelines developed principally for companion animals and slaughter of food animals, and not for free-ranging wildlife.

2.2.5 Impacts to stakeholders, including aesthetics.

The human attraction to animals has been well documented throughout history and started when humans began domesticating animals. The American public is no exception and today a large percentage of households have pets. However, some people may consider individual wild animals as "pets" or exhibit affection toward these animals, especially people who enjoy coming in contact with wildlife. Therefore, the public reaction is variable and mixed to wildlife damage management because there are numerous philosophical, aesthetic, and personal attitudes, values, and opinions about the best ways to reduce conflicts/problems between humans and wildlife.

There is some concern that the proposed action or the alternatives would result in the loss of aesthetic benefits to the public, resource owners, or neighboring residents. Wildlife generally is regarded as providing economic, recreational, and aesthetic benefits (Decker and Goff 1987), and the mere knowledge that wildlife exists is a positive benefit to many people. Aesthetics is the philosophy dealing with the nature of beauty, or the appreciation of beauty. Therefore, aesthetics is truly subjective in nature, dependent on what an observer regards as beautiful.

Wildlife populations provide a range of social and economic benefits (Decker and Goff 1987). These include direct benefits related to consumptive and non-consumptive use (e.g., wildlife-related recreation, observation, harvest, sale), indirect benefits derived from vicarious wildlife related experiences (e.g., reading, television viewing), and the personal enjoyment of knowing wildlife exists and contributes to the stability of natural ecosystems (e.g., ecological, existence, bequest values) (Bishop 1987). Direct benefits are derived from a user's personal relationship to animals and may take the form of direct consumptive use (using up the animal or intending to) or non-consumptive use (viewing the animal in nature or in a zoo, photography) (Decker and Goff 1987). Indirect benefits or indirect exercised values arise without the user being in direct contact with the animal and come from experiences such as looking at photographs and films of wildlife, reading about wildlife, or benefitting from activities or contributions of animals such as their use in research (Decker and Goff 1987). Indirect benefits come in two forms: bequest and pure existence

(Decker and Goff 1987). Bequest is providing for future generations and pure existence is merely knowledge that the animals exist (Decker and Goff 1987).

Many people directly affected by damage problems and threats to public health or safety caused by deer insist upon their removal from the property or public location when they cause damage. Some people have an idealistic view and believe that all wildlife should be captured and relocated to another area to alleviate damage or threats to public health or safety. Some people directly affected by the problems caused by wildlife strongly support removal. Individuals not directly affected by the harm or damage may be supportive, neutral, or totally opposed to any removal of wildlife from specific locations or sites. Some people totally opposed to deer damage management want WS to teach tolerance for damage and threats to public health or safety, and that wildlife should never be killed. Some people would strongly oppose removal of deer regardless of the amount of damage. Some of the people who oppose removal of wildlife do so because of human-affectionate bonds with individual wildlife. These human-affectionate bonds are similar to attitudes of a pet owner and result in aesthetic enjoyment.

Some deer hunters may be concerned that lethal deer damage management activities would reduce their hunting opportunities and the number of deer available for harvest during the regulated hunting season. In addition to being an effective deer management tool (VDGIF 1999, Craven and Hygnstrom 1994) regulated deer hunting also provides diverse recreational and economic benefits (VDGIF 1999). For example, the nationwide deer hunting expenditures during 1991 were estimated at $4.5 billion (USFWS 1992, VDGIF 1999).

Virginia WS only conducts wildlife damage management at the request of the affected home/property owner or resource manager. If WS received requests from an individual or official for deer damage management, WS would address the issues/concerns and consideration would be made to explain the reasons why the individual damage management actions would be necessary. Management actions would be carried out in a caring, humane, and professional manner.

2.2.6 Effects on urban landscaping and natural resources

Many property owners experience substantial damage to landscaping and vegetation from deer. These people are concerned whether the proposed action would reduce such damage to more acceptable levels. Some people are also concerned that high deer populations cause excessive damage to the native vegetation and subsequently adversely impact the natural ecosystem and other species of wildlife whose habitat is destroyed by deer over-browsing.

2.3 ADDITIONAL ISSUES USED TO DEVELOP MITIGATION MEASURES

2.3.1 Cultural Resources Concerns

The National Historic Preservation Act of 1966, as amended, requires federal agencies to evaluate the effects of any federal undertaking on cultural resources and to consult with appropriate American Indian Tribes to determine whether they have concerns for cultural properties in areas of federal undertakings. The Native American Graves and Repatriation Act of 1990 provides for protection of American Indian burial sites, human remains, funerary objects and sacred objects, and establishes procedures for notifying tribes of any new discoveries.

In most cases, deer damage management has little potential to cause adverse effects to sensitive cultural resources. The areas where damage management would be conducted are small and pose no ground

disturbance. The Virginia Department of Historic Resources (VDHR) has reviewed the program as proposed and concluded that the deer damage management program, does not "have the potential to affect historic properties." (C. Metz, Virginia Department of Historic Resources, letter to M. Lowney, WS, October 12, 2000).

2.3.2 Environmental Justice and Executive Order 12898 - *"Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations"*

Environmental Justice (EJ) has been defined as the pursuit of equal justice protection under the law for all environmental statutes and regulations without discrimination based on race, ethnicity, or socioeconomic status. Fair treatment implies that no person or group should endure a disproportionate share of the negative environmental impacts resulting from this country's domestic and foreign policies or programs.

Executive Order 12898 requires federal agencies to make EJ part of their mission, and to identify and address disproportionately high and adverse human health and environmental effects of federal programs, policies and activities on minority and low-income persons or populations. APHIS plans to implement Executive Order 12898 principally through the provisions of NEPA.

WS activities are evaluated for their impact on the human environment and compliance with Executive Order 12898 to insure EJ. WS personnel use wildlife damage management methods as selectively and environmentally conscientiously as possible. All chemicals used by APHIS-WS are regulated by the EPA through the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA), the Virginia Department of Agriculture and Consumer Services (VDACS), by MOUs with land managing agencies, and by WS Directives. Based on a thorough Risk Assessment, APHIS concluded that when WS program chemicals are used according to label directions, they are selective to target individuals or populations, and such use has negligible impacts on the environment (USDA 1997, Appendix P). The WS operational program properly disposes of any excess solid or hazardous waste. It is not anticipated that the proposed action would result in any adverse or disproportionate environmental impacts to minority and low-income persons or populations. In contrast, the proposed action may benefit minority or low-income populations by reducing deer threats to public health and safety.

2.3.3 Protection of Children from Environmental Health and Safety Risks (Executive Order 13045).

Children may suffer disproportionately from environmental health and safety risks for many reasons, including their development physical and mental status. Because WS makes it a high priority to identify and assess environmental health and safety risks that may disproportionally affect children, WS has considered the impacts that this proposal might have on children. The proposed deer damage management would only occur by using legally available and approved methods where it is highly unlikely that children would be adversely affected. For these reasons, WS concludes that it would not create an environmental health or safety risk to children from implementing this proposed action.

2.4 ISSUES NOT CONSIDERED IN DETAIL WITH RATIONALE

2.4.1 No wildlife damage management at taxpayer expense; wildlife damage management should be fee based.

Funding for WS comes from a variety of sources in addition to federal appropriations. Virginia agency funds, county funds, city funds, private funds, and other federal agency funds are applied to the program under Cooperative Agreements. Federal, State, and local officials have decided that wildlife damage management should be conducted by appropriating funds. WS was established by Congress as the agency responsible for providing wildlife damage management to the people of the United States. Wildlife damage management is an appropriate sphere of activity for government programs, since aspects of wildlife damage management are a government responsibility and authorized and directed by law.

2.4.2 Appropriateness of Preparing an EA (Instead of an EIS) For Such a Large Area.

Some individuals might question whether preparing an EA for an area as large as the Commonwealth of Virginia (26 million acres) would meet the NEPA requirements for site specificity. If in fact a determination is made through this EA that the proposed action would have a significant environmental impact, then an EIS would be prepared. In terms of considering cumulative impacts, one EA analyzing impacts for the entire State may provide a better analysis than multiple EA's covering smaller zones. In addition, Virginia WS only conducts deer damage management in a very small area of the Commonwealth where damage is occurring or likely to occur (see Section 1.5) and damage may occur anywhere in the Commonwealth (see Section 1.8.5).

CHAPTER 3: ALTERNATIVES

3.0 INTRODUCTION

This chapter consists of 7 parts: 1) an introduction, 2) description of alternatives considered and analyzed in detail including the Proposed Action (Alternative 1), 3) a description of Integrated Wildlife Damage Management, 4) Deer damage management methods available to WS in Virginia, 5) Additional methods recommended for use by WS and implemented by the property owner, 6) Alternatives considered but not in detail, with rationale, and 7) Mitigation measures and Standard Operating Procedures (SOPs) for deer damage management. Alternatives were developed for consideration using the WS Decision Model (Slate et al. 1992), *"Methods of Control"* (USDA 1997 Appendix J) and the *"Risk Assessment of Wildlife Damage Control Methods Used by the USDA Animal Damage Control Program"* (USDA 1997, Appendix P) of USDA (1997). The two alternatives analyzed in detail are:

- Alternative 1 - Continue the Current Deer Damage Management Program (No action/Proposed Action). This alternative is the proposed action and is the preferred alternative of WS.

- Alternative 2 - No WS Lethal Deer Damage Management in Virginia. This alternative would result in no lethal operational assistance from WS in Virginia.

3.1 ALTERNATIVES CONSIDERED, INCLUDING THE PROPOSED ACTION

3.1.1 Alternative 1. Continue the Current Deer Damage Management Program

Under this alternative, WS would lethally remove deer by shooting or by live-capture and euthanasia to reduce damage to agricultural and natural resources, property, and human health and safety. WS recommends and utilizes an Integrated Wildlife Damage Management (IWDM) approach to manage wildlife conflicts (USDA 1997). In this case, WS would assist with the implementation of one aspect of an IWDM plan, the lethal removal of deer. Implementation of non-lethal methods recommended by WS as part of an IWDM approach would be the responsibility of the property owner or manager. WS would also continue to provide technical assistance regarding the use of non-lethal and lethal methods of deer damage management. Technical assistance may include instructional sessions, information about exclusion devices, harassment, and lethal damage management methods (e.g. hunting or Kill Permits). WS damage management services would be conducted as authorized by various federal and state regulations and would be fully funded by service recipients.

3.1.2 Alternative 2. No WS Lethal Deer Damage Management in Virginia

This alternative would result in no lethal assistance from WS in reducing deer damage in Virginia. WS would continue to provide technical assistance.

All requests for lethal deer damage management assistance would not be responded to by WS and would be referred to the VDGIF or private businesses or organizations. Assistance may or may not be available from these entities. Lethal deer damage management methods could be implemented by resource owners, private businesses, volunteers, or local government employees.

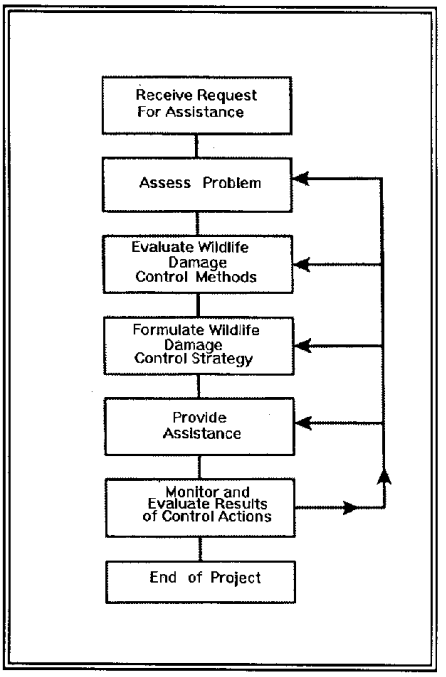
3.2 INTEGRATED WILDLIFE DAMAGE MANAGEMENT

Usually, the most effective approach to resolving wildlife damage is to integrate the use of several methods simultaneously or sequentially. IWDM is the implementation and application of safe and practical methods for the prevention and reduction of damage caused by wildlife based on local problem analyses and the informed judgement of trained personnel. The philosophy behind IWDM is to implement effective management techniques in a cost-effective manner while minimizing the potentially harmful effects to humans, target and non-target species, and the environment. IWDM draws from the largest possible array of options to create a combination of techniques for the specific situations. IWDM may incorporate cultural practices, habitat modification, animal behavior modification, removal of individual animals, local population reduction, or any combination of these, depending on the characteristics of the specific damage problems. WS supports and implements the IWDM approach (WS Directive 2.105) to reduce damage through the WS Decision Model (Slate et al. 1992) discussed on page 3-4.

3.2.1 WS Decision Making

The procedures used by WS personnel to determine management strategies or methods applied to specific damage problems can be found in USDA (1997 Appendix N).

Figure 3-1
WS Decision Model



WS personnel use a methodical thought process for evaluating and responding to damage complaints and requests for assistance that are depicted by the WS Decision Model described by Slate et al. (1992) (Figure 3-1). WS personnel are frequently contacted after requesters have tried or considered nonlethal methods and found them to be impractical, too costly, or inadequate for reducing damage to an acceptable level. WS personnel assess the problem, evaluate the appropriateness and availability (legal and administrative) of strategies and methods based on biological, economic and social considerations. Following this evaluation, the methods deemed to be practical for the situation are developed into a management strategy. After the management strategy has been implemented, monitoring is conducted and evaluation continues to assess the effectiveness of the strategy. If the strategy is effective, the need for further management may be ended. In some cases, continual conduct of effective wildlife damage management activities is necessary to relieve damage. In terms of the WS Decision Model (Slate et al. 1992), most damage management efforts consist of continuous feedback between receiving the request and monitoring the results of the ongoing damage management strategy. The Decision Model is not necessarily a written process, but a mental problem-solving process common to most, if not all professions.

3.3 DEER DAMAGE MANAGEMENT METHODS AVAILABLE TO WS IN VIRGINIA

Under Alternative 1, the Proposed Action, WS would primarily remove deer by shooting and would occasionally remove deer by live-capture and euthanasia. WS would conduct sharpshooting with center-fire rifles and shooting could occur during daylight hours or at night using spotlights or night-vision equipment. Rifles would be equipped with noise suppressors to avoid disturbance to residents and to facilitate success by minimizing the tendency of deer to flee from the sound of gunfire. Shots would be taken from elevated

positions in tree stands or in the beds of trucks to cause a downward angle of trajectory so that any bullets that inadvertently miss or pass through targeted deer will hit into the ground or into earthen embankments to minimize the risk of stray bullets presenting a safety hazard to people, pets, or property. WS personnel would strive for head and neck shots when shooting deer to achieve quick, humane kills. Bait may be used to attract deer to safe sites for shooting and to enhance success and efficiency. The venison from deer killed by WS would be processed and donated for consumption.

Only WS personnel who have completed firearms safety training, have demonstrated skill and proficiency with the firearms used for deer removal, and have been approved for sharpshooting by the State Director and/or District Supervisors in Virginia will participate in sharpshooting of deer.

WS could also conduct live-capture of deer followed by euthanasia in areas where sharpshooting may be inappropriate due to safety concerns. Capture methods for deer would include: darting with capture drugs, clover traps, box traps, drop nets, and rocket nets. Captured deer would be euthanized by methods recommended by the AVMA (AVMA 1993) or the recommendations of a veterinarian, even though the AVMA euthanasia methods were developed principally for companion animals and slaughter of food animals, and not for free-ranging wildlife. Venison from deer that were not exposed to capture drugs would be donated.

WS would only remove deer to alleviate damage to agricultural resources when the property owner has obtained a Kill Permit from the VDGIF and WS is listed as an agent on the permit. WS would follow the conditions of the permit. WS would only conduct operational deer management in urban or suburban areas after the VDGIF has issued either a Kill Permit or an Animal Population Control Permit (DPOP) and WS is listed as an agent on the permit. WS would follow the conditions of the permit. WS would initially remove deer from airports and airbases to reduce threats to aviation under regulatory authority. The airport or airbase would also be instructed to obtain a Kill Permit or Animal Population Control Permit (DPOP) from the VDGIF.

WS would provide technical assistance such as instructional sessions, information about exclusion devices, harassment, and lethal damage management methods (e.g. hunting or Kill Permits). Technical assistance could include demonstrations on the proper use of management devices (pyrotechnics, exclusion devices, etc.), wildlife habits and biology, habitat management, exclusion, and animal behavior modification. Technical assistance is generally provided following an on-site visit or verbal consultation with the requester. Bulletins and leaflets may be sent to citizens to inform them about types of deer damage and damage management methods. Generally, several management strategies are described to the requester for short and long-term solutions to damage problems; these strategies are based on factors such as need and practical application.

3.4 ADDITIONAL METHODS RECOMMENDED FOR USE BY WS AND IMPLEMENTED BY THE PROPERTY OWNER

3.4.1 Physical Exclusion. Fencing, netting, or other barriers around airports, yards, parks, individual plants, and high-risk roadways can limit deer access. There are several types of fences that can inhibit deer access (e.g., temporary electric, high tensile electric, woven wire, chain-link, and solid wall fencing) (Craven and Hygnstrom 1994, Danielson and Hubbard 1998, Hygnstrom and Craven 1988, Pennsylvania Game Comm. et al. 1982). Several types of barriers (e.g., woven wire cylinders) have proven effective in reducing antler-rubbing damage to shrubs and trees (Craven and Hygnstrom 1994). Disadvantages of fences and barriers are that some or many homeowners may find them to be aesthetically unacceptable or

too expensive to implement.

3.4.2 Cultural and Habitat Modifications. Enforcing a no feeding policy can help reduce concentrations of deer in urban areas. Modifying or eliminating habitat utilized by deer may change deer behavior and reduce some deer-human conflicts. This could include reducing vegetative cover and forage plants used or preferred by deer, or by utilizing less palatable landscape plants (Austin and Hash 1988, Fargione et al. 1991, Conover and Kania 1988). Although this strategy can reduce damage to landscaping, it is not generally useful in reducing agricultural damage, disease threats, deer-aircraft collisions, or deer-vehicle collisions, except in situations where roadside vegetation is an attraction to deer, or where such collisions are a result of deer being attracted across roads to get to preferred food plants.

3.4.3 Frightening Devices. The proper use of frightening devices and harassment techniques including sirens, flashing lights, electronic distress sounds, pyrotechnics, propane exploders, light reflectors along roadways, dogs, and rubber projectiles fired from a shotgun could help reduce conflicts (Craven and Hygnstrom 1994, Inebrigtsen and Ludwig 1986). Used in the proper context, these devices can help keep deer away from conflict areas. Some disadvantages are that these methods can be labor intensive and expensive, and can be disturbing to residents. Also, frightening methods must be continued indefinitely unless the deer population is reduced or excluded from the resource.

3.4.4 Chemical Repellents. Chemical contact repellents applied to vegetation have been used to discourage deer from browsing (Mason 1997, Craven and Hygnstrom 1994, Swihart and Conover 1990, Palmer et al. 1983). Results of commercially available and home remedy deer repellents have met with varying success. Area repellents are generally considered less effective, and the effectiveness of contact repellents may depend on deer densities and the availability of alternative food (Craven and Hygnstrom 1994). Disadvantages of chemical repellents are that they must be reapplied fairly often, particularly after rain, and can therefore become expensive to maintain. They also are ineffective for reducing deer-vehicle collisions, deer-aircraft collisions, or disease threats. In addition, repellents are impractical for use on most row crops, pastures, and other large areas because of their high cost, limitations on use, and viarable effectiveness (Craven and Hygnstrom 1994).

3.4.5 Hunting Programs. Effective use of legal deer hunting is probably one of the best ways to manage deer populations (Craven and Hygnstrom 1994, VDGIF 1999*)*. By permitting legal hunting, airports and private property owners provide access to a public resource while at the same time reducing deer damage problems. Mechanisms for managing deer population levels in a specific area already exist in most states. Either-sex seasons, increased bag limits, antlerless-only permits, special depredation seasons, and a variety of other management techniques have been used successfully to reduce deer numbers. However, legal hunting is not always practical or safe on some parts of airports and in some urban or suburban areas. Additionally traditional hunting programs may not sufficiently reduce deer populations.

3.5 ALTERNATIVES CONSIDERED BUT NOT IN DETAIL, WITH RATIONALE

3.5.1 Population stabilization through birth control. Deer would be sterilized or contraceptives administered to limit the ability of deer to produce offspring. Contraceptive measures for deer can be grouped into four categories: surgical sterilization, oral contraception, hormone implantation, and immunocontraception (the use of contraceptive vaccines). These techniques would require that deer receive either single, multiple, or possibly daily treatment to successfully prevent conception. The use of this method would be subject to approval by Federal and State Agencies. This alternative was not considered in detail because: (1) it would take a number of years of implementation before the deer population would decline and therefore, damage would continue at the present unacceptable levels for a number of years; (2)

surgical sterilization would have to be conducted by licensed veterinarians, would therefore be extremely expensive, (3) it is difficult, time-consuming, and expensive to effectively live trap, chemically capture, or remotely treat the number of deer necessary to effect an eventual decline in the population; (4) no chemical or biological agents for contracepting deer have been approved for use by State and Federal regulatory authorities.

3.5.2 Eradication and Suppression

An eradication and suppression alternative would direct all Virginia WS deer damage management efforts toward planned, total elimination or suppression of deer.

Eradication of deer in Virginia is not supported by Virginia WS or VDGIF. By VDGIF policy, the VDGIF is directed, *to maintain optimum populations of all species to serve the needs of the Commonwealth."* Other statutory policies are to preserve the State's natural resources and wildlife, and to protect wetlands (VCA §§3.1-1020, §§10.1-209, §§10.1-1188, §§10.1-1193, §§10.1-1198) (Defenders of Wildlife and the Center for Wildlife Law 1996). This alternative will not be considered by Virginia WS in detail because:

- Virginia WS opposes eradication of any native wildlife species,
- VDGIF opposes eradication of any native Virginia wildlife species,
- The eradication of a native species would be extremely difficult if not impossible to accomplish, and cost prohibitive, and
- Eradication of native species is not acceptable to most members of the public.

3.5.3 Live-capture and relocation. Under this alternative WS would capture deer alive using cage-type live traps or capture drugs administered by dart gun and then relocate the captured deer to another area. Numerous studies have shown that live-capture and relocation of deer is relatively expensive, time-consuming, and inefficient (Ishmael and Rongstad 1984, O'Bryan and McCullough 1985, Diehl 1988, Jones and Witham 1990, Ishmael et al. 1995). Population reduction achieved through capture and relocation is labor intensive and would be costly ($273-$2,876/deer) (O'Bryan and McCullough 1985, Bryant and Ishmael 1991). Additionally, relocation frequently results in high mortality rates for relocated deer (Cromwell et. al. 1999, O'Bryan and McCullough 1985, Jones and Witham 1990, Ishmael et al. 1995). Deer frequently experience physiological trauma during capture and transportation and deer mortality after relocation has ranged from 25-89% (Jones and Witham 1990, Mayer et al. 1993). O'Bryan and McCullough (1985) found that only 15% of radio-collared black-tailed deer that were live-captured and relocated from Angel Island, California, survived for 1 year after relocation. Although relocated deer usually do not return to their location of capture, some do settle in familiar suburban habitats and create nuisance problems for those communities (Bryant and Ishmael 1991). High mortality rates of relocated deer, combined with the manner in which many of these animals die, make it difficult to justify relocation as a humane alternative to lethal removal methods (Bryant and Ishmael 1991). Chemical capture methods require specialized training and skill. A primary limitation of darting is the limited range at which deer can be effectively hit which is generally less than 40 yards. With modern scoped rifles, however, a skilled sharpshooter can hit the head or neck of a deer for a quick kill out to 200 yards and beyond. Thus, chemical capture is far less efficient, more labor intensive, and much more costly than removal with rifles. Additionally, the American Veterinary Medical Association, the National Association of State Public Health Veterinarians, and the Council of State and Territorial Epidemiologists opposes relocation of mammals because of the risk of disease transmission (USDA 1997).

3.5.4 Use of Regulated Hunting as a Deer Management Tool. Sport hunting by private individuals regulated by wildlife management agencies can be an effective deer population management tool and can be

one of the most efficient and least expensive techniques for removing deer in some situations (NH G&F 1988). However, regulated hunting with firearms is often not allowed in urban or suburban areas because of safety concerns and local ordinances. In agricultural areas, regulated hunting may not reduce the deer population sufficiently to reduce damage or the regulated hunting season may not coincide with seasonal deer damage to agricultural resources. Additionally, airports and airbases are often not accessible to the public for hunting. Lethal deer removal by WS, under the Proposed Action, would not prevent regulated deer hunting, but would be used as an additional method of reducing deer numbers in areas where hunting is legal and practical or in areas where hunting is impractical.

3.5.5 Use of Archery Hunting as a Deer Management Tool. In urban and suburban areas where traditional hunting with firearms is not applicable because of public safety concerns, state hunting laws, and local ordinances restricting the use of firearms, archery hunting may provide an alternative method for reducing deer populations (Kilpatrick and Walter 1999). Archery hunting may be used as an effective management tool to reduce urban deer populations (Kilpatrick and Walter 1999). However, it may be difficult to remove a sufficient number of deer using archery hunting alone. Ver Steeg et al. (1995) found that a controlled archery hunt did not sufficiently reduce the deer population in a suburban park in Illinois. Although some deer were removed by archery hunters, sharpshooting was used after the archery hunts were completed to ensure that the annual deer herd reduction goals were reached. Sharpshooting was nearly twice as efficient as archery hunting, with an overall removal rate of 3.76 deer per day for sharpshooting and 1.95 deer per day for archery hunting (Ver Steeg et al. 1995).

In Northern Virginia, a nonprofit organization called Suburban Whitetail Management sends volunteer archery hunters to residents' suburban property to reduce deer numbers (Tolme 1999). The property owner obtains a Kill Permit from the VDGIF to allow them to remove deer and Suburban Whitetail Management provides skilled archers to harvest deer. Alternatively, the residents could remove deer from their properties themselves under the Kill Permit, but most lack the skill, equipment, or willingness to do so. While bowhunting under Kill Permits on specific properties may alleviate damage for some homeowners, it provides little relief for more large-scale damage problems. Additionally, some people may view archery hunting as less humane than sharpshooting, because deer may not be killed as quickly as they would by a bullet in the head or neck.

The Proposed Action, lethal removal of deer by WS, would not preclude the use of archery hunting as a method of deer population reduction in urban or suburban areas. Communities could choose which approach would be best for their situation, or could use a combination of both archery hunting and deer removal by WS.

3.5.6 Supplemental Feeding. Supplemental feeding would involve providing acceptable deer foods (e.g. corn or a balanced ration diet) either during certain annual periods when deer browsing on ornamental plants and flowers is most severe, or on a year-round basis. This alternative was not considered in detail because deer numbers would most likely continue to grow, perhaps to a level even higher than what would occur without such feeding, requiring increased costs for supplemental feed, and increasing the occurrence of damage to property, agricultural and natural resources, and threats to human health and safety. Additionally, supplemental feeding may result in the spread of disease among wild deer populations. The congregation of deer and contact between deer at feeding sites may increase the transmission of diseases such as tuberculosis (Anonymous 1997).

3.5.7 Technical Assistance Only: WS personnel provide technical assistance such as information, instructional sessions, demonstrations and advice on available deer damage management techniques. Technical assistance includes demonstrations on the proper use of management devices (pyrotechnics,

exclusion devices, etc.), wildlife habits and biology, habitat management, exclusion, and animal behavior modification. Technical assistance is generally provided following an on-site visit or verbal consultation with the requester. Bulletins and leaflets may be sent to citizens to inform them about types of deer damage and damage management methods. Generally, several management strategies are described to the requester for short and long-term solutions to damage problems; these strategies are based on factors such as need and practical application. Technical assistance may require substantial effort by WS personnel in the decision making process, but the actual work is the responsibility of the requester. Technical assistance only was not addressed as an alternative because under APHIS NEPA Implementing Procedures (§ 372.5(c)) technical assistance is categorically excluded and does not require analysis and public scrutiny under EIS or EA procedures.

3.6 MITIGATION AND SOPs FOR DEER DAMAGE MANAGEMENT

3.6.1 Mitigation and SOPs

Mitigation measures are any feature of an action that serves to prevent, reduce, or compensate for impacts that otherwise might result from that action. The current WS program, nationwide and in Virginia, uses many such mitigation measures and these are discussed in detail in Chapter 5 of USDA (1997). The following mitigating measures are incorporated into WS's SOPs and the Proposed Action (Alternative 1):

Alternative 1 - Continue the Current Deer Damage Management Program
Alternative 2 - No WS Lethal Deer Damage Management in Virginia.

- Research on selectivity and humaneness of management practices would be monitored and adopted as appropriate.
- The Decision Model (Slate et al. 1992) would be used to identify effective biologically and ecologically sound deer damage management strategies and their impacts.
- Captured non-target animals would be released unless it is determined by the Virginia WS personnel that the animal would not survive.
- The use of traps would conform to current laws and regulations administered by VDGIF and Virginia WS policy.
- Captured deer would be euthanized by methods recommended by the AVMA (AVMA 1993) or the recommendations of a veterinarian.
- The use of newly-developed, proven, non-lethal methods would be encouraged when appropriate.
- Deer damage management conducted on public lands would be coordinated with the management agency.
- Live traps would be placed so that captured animals would not be readily visible from any road or public area.
- WS employees who use firearms to conduct official duties are required to attend an approved firearms

safety and use training program within 3 months of their appointment and a refresher course every 3 years afterwards (WS Directive 2.615).

- WS personnel would be approved for sharpshooting by the State Director or District Supervisor in Virginia after demonstrating skill, proficiency, and safe handling of the firearm .
- WS consulted with the USFWS regarding the nation-wide program and would continue to implement all applicable measures identified by the USFWS to ensure protection of T&E species.
- Virginia WS's deer take would be considered with the statewide "*Total Harvest*" when estimating the impact on wildlife species.
- Management actions would be directed toward localized populations or groups and/or individual offending animals, dependent on the magnitude of the problem.
- The hardened antlers of male deer killed by WS would be removed or destroyed before deer are donated.
- WS personnel would be trained and experienced to select the most appropriate method for taking targeted animals and excluding non-target species.
- WS would initiate informal consultation with the USFWS following any incidental take of T&E species.
- WS would not shoot or trap deer within 300 yards of any active eagle nest where WS observes nesting eagles within the project area, pending natural dispersal of those birds.

CHAPTER 4: ENVIRONMENTAL CONSEQUENCES

4.0 INTRODUCTION

Chapter 4 provides information for making informed decisions on the deer damage management program outlined in Chapter 1, and the issues and affected environment discussed in Chapter 2. This chapter consists of: 1) analysis of environmental consequences, 2) analysis of each alternative against the issues considered in detail, and 3) summary of WS's impacts.

4.1 ENVIRONMENTAL CONSEQUENCES

This section analyzes the environmental consequences using Alternative 1 (the current program) as the baseline comparing the other alternatives to determine if the real or potential impacts are greater, lesser or the same (Table 4-4).

The following resource values within Virginia would not be adversely impacted by any of the alternatives analyzed: soils, geology, minerals, water quality/quantity, flood plains, wetlands, visual resources, air quality, prime and unique farmlands, aquatic resources, timber, and range. These resources will not be analyzed further.

4.1.1 Social and Recreational Concerns are discussed throughout the document as they relate to issues raised during public involvement, and they are discussed in USDA (1997).

4.1.2 Cumulative and Unavoidable Impacts are discussed in relationship to the wildlife species and the environmental impacts are analyzed in this chapter. This EA recognizes that the total annual removal of individual animals from wildlife populations by all causes is the cumulative mortality. Analysis of the Virginia WS "*takes*" during 1997, 1998 and 1999, in combination with other mortality, indicates that cumulative impacts are not adversely affecting the viability and health of populations (see section 4.2.1). It is not anticipated that the Virginia WS program would result in any adverse cumulative impacts to T&E species, and deer damage management activities do not jeopardize public health and safety.

4.1.3 Irreversible and Irretrievable Commitments of Resources: Other than minor uses of fuels for motor vehicles and electrical energy for office maintenance, there are no irreversible or irretrievable commitments of resources. Based on these estimates, the Virginia WS program produces very negligible impacts on the supply of fossil fuels and electrical energy.

4.2 ISSUES ANALYZED IN DETAIL

This section presents the expected consequences of each alternative on each of the issues analyzed in detail.

4.2.1 Alternative 1. Continue the Current Deer Damage Management Program

Effects on deer populations. WS would reduce local deer populations to reduce damage in specific locations. Deer would still be present in these locations, although at lower numbers. This action would have no effect on deer populations in other areas or on the statewide deer population in Virginia.

Impact Analysis for Virginia Deer Population.

The authority for management of resident wildlife species in Virginia is the responsibility of the VDGIF. VDGIF compiles and provided information on population trends and harvest, and uses this information to manage deer populations. VDGIF estimates that the current pre-hunt deer population is fairly stable at approximately 950,000-1,000,000 animals (VDGIF 1999).

Table 4-1. Deer Harvest Data for Virginia (MIS 1996, 1997, 1998, VDGIF 1999).

Deer Harvest Data	1997	1998	1999
WS Kill	4	27	88
# Taken During State Regulated Harvest Season	198,561	179,027	189,572
# Taken under VDGIF Kill Permits	5,665	5,474	5,558
Total Deer Take	204,230	184,528	195,218
%WS Take (% of total take)	<.01	.01	.04

WS killed 4, 27, and 88 deer in FY97, 98 and 99, respectively. The FY99 take was the highest number ever removed in one year by the WS program in Virginia. The VDGIF estimated the deer harvests for 1997, 1998, and 1999 at 198,561; 179,027; and 189,572, respectively. An additional 5,665; 5,474; and 5,558 deer were removed in 1997, 1998, and 1998, respectively, under kill permits issued by the VDGIF.

Cumulatively, the total kill of deer during 1999 from the regulated harvest season, WS damage management activities, and under Kill Permits was 195,218 which is only 21% of the estimated statewide population of 950,000 deer. WS deer take accounted for only .04% of the total deer harvest in 1999. The WS impact on the deer population in the Commonwealth of Virginia is therefore considered to be of extremely low magnitude. The VDGIF has concurred that WS deer damage management activities would not adversely impact deer populations in the Commonwealth of Virginia, and that the deer population impacts covered by the EA would all be at a local level (W.M. Knox, VDGIF, letter to M. Lowney, WS, September 14, 2000).

Effects on non-target species, including T&E species. The method of sharpshooting is virtually 100% selective for target species because shooters will only fire when a target animal has been positively identified. There is perhaps a slight risk that a non-target animal such as a cottontail rabbit could be inadvertently struck by a bullet that misses or passes through a targeted deer; however, the risk is insignificant. If a non-target animal is captured while trapping deer, it would be released unharmed. The USFWS has determined that WS deer management activities would have no adverse impacts on any T&E species (USDI 1992). WS has also determined that no T&E species would be adversely affected by the proposed action (M. Lowney, WS, letter to K. Mayne, USFWS, July 31, 2000; M. Lowney, WS, letter to K. Mayne, USFWS, September 28, 2000).

Effects on human health and safety. The risk of a stray bullet inadvertently striking a member of the public is virtually eliminated by precautionary measures in place as described section 3.3 (shooting at a downward angle from elevated positions, positively identifying target animals before shooting, using rifles that fire single projectiles per shot, using only specially trained and certified personnel). A formal Risk Assessment in the programmatic EIS determined that no probable risk to the public or to non-target animals is expected from WS use of firearms (USDA 1997, Appendix P). There is a small risk of injury to personnel who are shooting in the rare event that a malfunction of a firearm occurs (e.g., obstructed barrel). This risk is

minimized by using trained and experienced personnel. A positive effect on human safety and health would result from a reduced risk of deer-vehicle collisions, deer-aircraft collisions, and reduced risk of human exposure to Lyme Disease and Erlichiosis.

Humaneness of methods to be used. WS personnel will strive for head and neck shots when shooting deer to achieve quick kills. This is the most humane method of shooting that is practically available under field conditions and would minimize pain and suffering of the deer that are removed. Experience has shown that head or neck shots result in almost immediate death which aligns closely with principles of euthanasia described by the American Veterinary Medical Association (AVMA 1993). Some persons will still view this method as inhumane, however. Fewer deer would be injured or killed by vehicle collisions or aircraft strikes under this alternative which could be viewed as a positive effect on humaneness.

Impact to stakeholders, including aesthetics. Public reaction would be variable and mixed because there are numerous philosophical, aesthetic, and personal attitudes, values, and opinions about the best ways to reduce conflicts/problems between humans and wildlife. This alternative would likely be favored by most resource owners who are receiving damage. Some animal activists and a minority of environmental activists would strongly oppose this alternative because they believe it is morally wrong to kill or use animals for any reason or they believe that the aesthetic benefits from deer outweigh the associated damage. Some people may believe that they have developed affectionate bonds with individual deer, and if those particular deer end up being among those removed by the action, they may feel sadness and perhaps anger. Some people will have the opinion that deer should be captured and relocated to a rural area to alleviate damage or threats to public and pet health or safety. Some people would strongly oppose removal of the deer regardless of the amount of damage. Individuals not directly affected by the threats or damage may be supportive, neutral, or totally opposed to any removal of deer from specific locations or sites. Some people that totally oppose lethal damage management want WS to teach tolerance for deer damage and threats to public and pet health or safety, and that deer should never be killed

The ability to view and esthetically enjoy deer at a particular site could be limited if the deer are removed. New deer would likely use the site in the future, although the length of time until new animals arrive is variable, depending on the habitat, time of year, and population densities in the area. The opportunity to view deer is available if a person makes the effort to visit sites with adequate habitat outside of the damage management area.

The opportunity to hunt deer in the local area may be reduced under the proposed action. However, WS would primarily conduct lethal deer removal in areas that are not accessible to hunters or where hunting is impractical (i.e. urban/suburban areas, the AOA at airports and military airbases). In other situations, WS assistance would be required if regulated hunting failed to achieve deer damage management goals. In agricultural areas, and in suburban areas and airports where hunting was allowed, WS lethal deer removal would occur in combination with regulated deer hunting rather than exclusively. Additionally, WS would not remove a number of deer which exceeds the number that the property owner could otherwise remove without WS assistance, as permitted by the VDGIF.

Effects on urban landscaping and natural resources. Positive impacts would be the reduction of damage to landscaping and eliminating or substantially reducing the problem of overbrowsing by deer on native vegetation, thereby reducing the adverse effects on other wildlife species (e.g., neotropical migrant songbirds and small mammals) that depend upon the understory vegetative habitat destroyed by deer browsing (VDGIF 1999, Casey and Hein 1983, DeCalesta 1994, DeCalesta 1997).

4.2.2 Alternative 2. No WS Lethal Deer Damage Management in Virginia

Effects on deer populations. If no action is taken to reduce deer populations, the number of deer would continue to increase in the local area. In some areas the deer population could increase until the habitat can no longer support such large numbers of deer and the population would begin to decline due to starvation and disease problems (Davidson and Doster 1997). Sams et al. (1996) also found that the transfer of passive immunity to newborn fawns was compromised in an overpopulated deer herd, resulting in increased mortality of fawns in their first few weeks. The primary factor influencing the transfer of passive immunity to fawns was suspected to be malnutrition of the does because of herd overpopulation. Malnourished does have also been found to exhibit failure to groom or nurse young and to exhibit aggression towards their newborn fawns (Langenau and Lerg 1976).

If property owners/managers reduce the deer populations without WS assistance, the effects on deer populations would be about the same as under the proposed action.

Effects on non-target species, including T&E species. If property owners/managers conduct deer removal activities without WS assistance, it is unlikely that the risk to non-target or T&E species would be any greater than under the proposed action if the same precautionary measures used by WS were followed. If no reduction in the deer population is achieved, the population would remain high and/or continue to increase which could have detrimental effects on other wildlife species (e.g., neotropical migrant songbirds and small mammals) that depend upon the understory vegetative habitat destroyed by deer browsing (DeCalesta 1994, VDGIF 1999).

Effects on human health and safety. If deer populations were not reduced there could be continued or increased threats to human health and safety from deer-vehicle collisions, deer-aircraft collisions, and disease transmission. If property owners/managers reduce the deer population without assistance from WS, these risks to human safety could be reduced, depending on the degree of population reduction achieved. Safety risks to the public or to personnel conducting the removal could be greater or about the same as the proposed action, depending on the level of experience and training of the personnel who would be using firearms.

Humaneness of methods to be used. If no assistance were available from WS, property owners/managers would probably attempt to reduce the deer population using hunters or by sharpshooting. If these shooters also strive for head and neck shots, as WS would under the proposed action, the humaneness of the methods would be similar as under the proposed action. This is the most human method of shooting that is practically available and will minimize pain and suffering. If the shooters are relatively inexperienced or lack training, body shots are more likely to be taken which may result in kills that are not as instantaneous as head/neck shots. Some people would view that result as less humane than the proposed action. Also, if the deer populations are not reduced to the extent possible under the proposed action, there would continue to be a greater number of deer injured or killed by vehicle collisions and aircraft strikes.

Impact to stakeholders, including aesthetics. The impacts of this alternative to stakeholders would be variable depending on their values towards wildlife and compassion for their neighbors, and the actions taken by property owners/managers without WS assistance. Resource owners receiving damage from deer would likely oppose this alternative unless effective deer population reduction were implemented by another means. Animal activists and a minority of environmental activists would prefer this alternative because activists believe it is morally wrong to kill or use animals for any reason. Some people would support this alternative because they enjoy seeing deer, or having deer nearby.

Under this alternative, property owners/managers would likely conduct deer removal activities without WS assistance, and the impact to stakeholders would probably be about the same as under the proposed action.

Effects on urban landscaping and natural resources. If no action is taken to reduce deer populations, deer damage to landscaping and to native vegetation and the natural ecosystem would probably increase as deer populations continue to increase. If property owners/managers reduce the deer population without assistance from WS, the effects on landscaping and natural resources would be about the same as under the proposed action, depending on the degree of population reduction achieved.

4.3 SUMMARY OF WS's IMPACTS

Table 4-2 presents a relative comparison of the anticipated impacts of each of the alternatives as they relate to each of the major issues identified in Chapter 2.

4.3.1 Cumulative Impacts

No significant cumulative environmental impacts are expected from either of the alternatives (Table 4-2). With regard to Alternative 1, the Proposed Action, the lethal removal of deer causing damage would have no adverse affect on deer populations in the Commonwealth of Virginia. No risk to human health or safety is expected from the proposed alternative (Alternative 1). Although some persons would likely oppose lethal removal of deer, the analysis in this EA indicates that such removals would result in no significant cumulative adverse impacts on the quality of the human environment.

Table 4-2. Summary of Anticipated Cumulative Impacts from the Alternatives Analyzed

Issues/Impacts	**Alternative 1 - Deer Damage Management by WS**	**Alternative 2 - No Lethal Deer Damage Management by WS**
Effects on Deer population	Local populations in areas with damage would be reduced and sustained at lower level. No effect on statewide deer population.	If property owner conducts deer removal without WS, same as Alt. 1. If not, population would continue to increase.
Effects on Non-target and T&E Species	No probable effect.	No probable effect. If no reduction occurs, there may be some threat to songbirds through destruction of habitat.
Effects on Human Health & Safety	No probable direct negative effect. Positive effect from reduced deer-vehicle and deer-aircraft collisions and reduced risk of disease transmission.	If property owner conducts deer removal without WS, same as Alt. 1. If not, continued negative effects from deer-vehicle and deer-aircraft collisions and disease.
Humaneness of Methods to be Used	Some people will view as inhumane. Others will view as more humane than starvation and more humane because of fewer deer injured or killed by vehicle collisions.	If property owner conducts deer removal without WS, similar to Alt. 1. If not, some people will view as more humane. Some people will view as less humane because of deer starvation and vehicle collisions.
Impacts to Stakeholders, Including Aesthetics	Variable. Those receiving damage would probably favor this alternative. Some activists would oppose this alternative.	Variable. Some people prefer this method. Those receiving damage probably oppose this alternative.
Effects on Urban Landscaping and Natural Resources	Positive effect due to reduction in deer browsing.	If property owner conducts deer removal without WS, similar to Alt. 1. If not, browsing will continue at current level or increase.

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